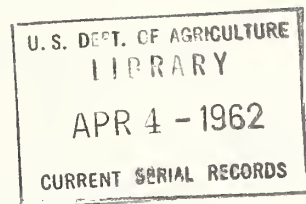


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GROWTH OF LONGLeAF PINE SEEDLINGS UNDER LARGE PINES AND OAKS IN MISSISSIPPI

Lloyd F. Smith



SOUTHERN FOREST EXPERIMENT STATION

PHILIP A. BRIEGLER, DIRECTOR

Forest Service, U. S. Department of Agriculture

When brown spot needle blight was controlled, longleaf pine seedlings survived and started height growth near large pines and oaks. Oaks were severer competitors than pines.

In 1949 a study was established in south Mississippi to measure the response of longleaf pine (*Pinus palustris* Mill.) seedlings to competition from overstory pines and oaks. An earlier publication¹ summarized results for the first 5 years after the seedlings were established—i. e., while they were mainly still in the grass. This article reports their development during the early stages of height growth.

THE STUDY

The competing trees were southern red oak (*Quercus falcata* Michx.), post oak (*Q. stellata* Wangenh.), and old- and second-growth longleaf pine seed trees. The old-growth pines had been suppressed in early life; their crowns averaged 18 feet in diameter, as compared to 22 feet for second-growth longleaf and 29 feet for oaks.

Overstory trees numbered 28: 12 pines and 4 oaks on the Harrison Experimental Forest in Harrison County, and 12 pines on the McNeill Experimental Forest in Pearl River County. (An oak from the original establishment died in 1953). Thus there were 84 plots near overstory trees, plus 12 check plots in the open.

A circle of 30-foot radius was drawn around each large tree and divided into 3 concentric circular zones 10 feet in width. A rectangular plot about 25 square feet in area was then located in each zone, and check plots of the same size were established nearby in the open. About half the plots had seedlings from the 1947 crop and half from the 1948 crop. Each age class was on a separate area that had been burned before seedfall.

Soils on both areas were upland fine sandy loams, well drained. Starting in 1949, seedlings were sprayed periodically to reduce defoliation by the brown spot needle disease.

RESULTS

When the plots were last examined, in January 1958, the 1948 seedlings were 9 years old and the 1947 seedlings 10 years old. To simplify comparisons, the data here presented are for an age of 9 years in both seedling classes. At this age the seedlings varied widely in size but most were making active height growth in the sense that they had attained a stem height of at least 3 inches.

At 9 years, average seedling survival was 86 to 100 percent (table 1). It was high on all plots except those with 1948 seedlings near three old-growth pines at McNeill, where, for reasons unknown, it ranged from 53 to 70 percent. Differences among the types of competition trees and among zones were not statistically significant.

A few seedlings had begun height growth at 4 years of age. By 9 years, 55 to 83 percent of the seedlings near large pines had started height growth, as compared with 89 percent of those on check plots (table 1). Near large oaks 24 to 68 percent of the living seedlings were making height growth; these percentages were significantly less than those for seedlings near large pines.

The proportion making height growth was consistently higher on check plots than near large trees (fig. 1).

Average heights ranged from 9 to 24 inches. In general, seedlings were smallest in the 0- to 10-foot zone and largest in the 20- to 30-foot zone and on check plots, but there were some exceptions near individual large trees. Differences in average seedling heights among zones were significant at the 1-percent level, but

¹ Smith, L. F. 1955. Development of longleaf pine seedlings near large trees. Jour. Forestry 53: 289-290.

Table 1.—Seedling data at 9 years

Type of large tree and competing zone (feet)	Living seedlings ¹	Seedlings making height growth	Seedling heights		
			Average of seedlings making height growth	Average of tallest seedling per plot ²	Tallest individual in each treatment
-- Percent --					

¹ Basis: 10 seedlings per plot in 1952.² Means of tallest seedling per plot on 12 plots in each zone near pines and on 4 plots in each zone near oaks.

differences between the 20- to 30-foot zone and the check plots were not significant. Average seedling heights did not differ significantly by type of large tree.

One seedling per plot is considered adequate for restocking the stand. Height of the tallest individual per plot—i. e., the tree that will dominate plot population in the future—fol-

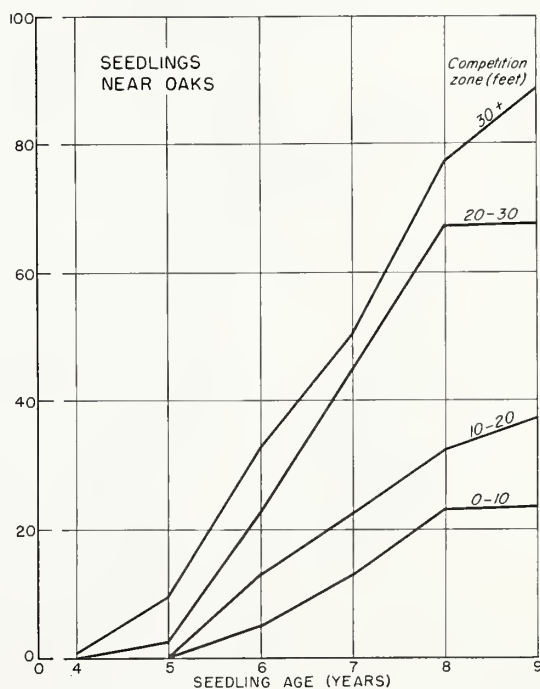
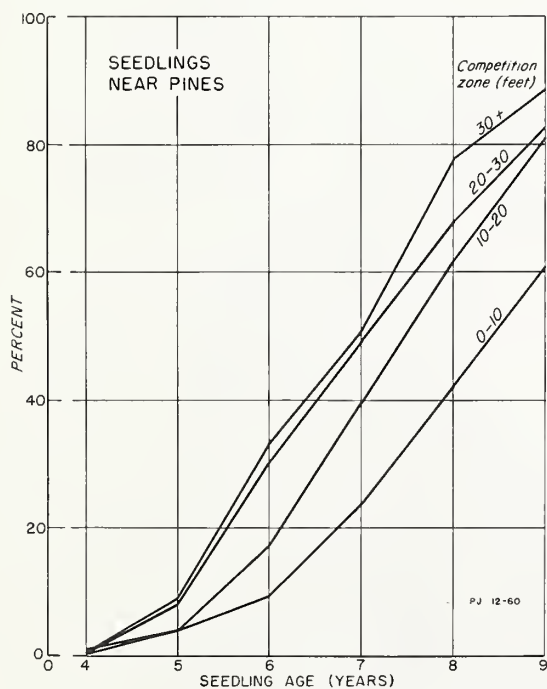


Figure 1.—Percent of longleaf seedlings starting height growth, in competition zones near large pines and oaks.

lowed the same trend as the means of all seedlings making height growth. Differences due to type of competition tree were not significant; differences among zones were significant at the 1-percent level; variance of mean heights between the 20- to 30-foot zone and check plots was not significant.

The tallest individual in each treatment ranged from 41 to 124 inches (table 1). The tallest in five of the six competition zones near large pines exceeded the maximum height of 86 inches found on the check plots, while none of the seedlings growing near oaks exceeded the tallest check seedling.

In summary, seedling growth indicated no significant difference between the competitive

effects of old-growth and second-growth longleaf pines. Large oaks were severer competitors than pines. Average seedling survival ranged from 86 to 100 percent under the different classes of competition.

Prompt removal of large trees following seedling establishment will aid longleaf reproduction, but this study indicates that, if brown spot is controlled, many longleaf seedlings will survive and start height growth near large pines. Prescribed burning, the usual method of controlling brown spot, is likely to be more than usually difficult in the fuel accumulations near overstory trees. Many seedlings may be killed unless the fire is set under such conditions that only the surface litter will burn.

Figure 2.—

Longleaf reproduction, 11½ years old, in three competition zones near an old-growth seed tree. White signs indicate location of plots. The range pole is 7 feet. Brown spot needle blight probably prevented seedlings off the plot from initiating height growth.

